

1 1. A method of computing a drift reduction block for use in reducing drift in a  
2 block of quantized MPEG discrete cosine transform coefficients, comprising:  
3 processing a block of discrete cosine transform coefficients by dropping at  
4 least one coefficient in the block;  
5 forming a dropped coefficient block containing the at least one coefficient;  
6 inverse quantizing the at least one coefficient to produce an inverse quantized  
7 dropped coefficient block; and  
8 inverse discrete cosine transforming the inverse quantized dropped  
9 coefficient block to produce the drift reduction block.

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11 2. The method according to claim 1, wherein the processing comprises  
12 dropping at least one coefficient in the block containing high frequency coefficients.

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14 3. The method according to claim 1, wherein the processing comprises  
15 dropping a plurality of high frequency coefficients.  
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1 4. A method of computing a drift reduction frame for use in reducing drift in a  
2 frame comprising blocks of quantized MPEG discrete cosine transform coefficients,  
3 comprising:

4 for each block in the frame:

5 processing a block of discrete cosine transform coefficients by  
6 dropping at least one coefficient in the block;

7 forming a dropped coefficient block containing the at least one  
8 coefficient;

9 inverse quantizing the at least one coefficient to produce an inverse  
10 quantized dropped coefficient block; and

11 inverse discrete cosine transforming the inverse quantized dropped  
12 coefficient block to produce the drift reduction block.

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14 5. The method according to claim 4, wherein the processing comprises  
15 dropping at least one coefficient in the block containing high frequency coefficients.

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17 6. The method according to claim 4, wherein the processing comprises  
18 dropping a plurality of high frequency coefficients.

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20 7. The method according to claim 4, further comprising mapping a block of  
21 video coefficients to a corresponding block of coefficients in the drift reduction frame  
22 using a motion vector.

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24 8. The method according to claim 7, further comprising discrete cosine  
25 transforming the block of coefficients in the drift reduction frame.

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27 9. The method according to claim 8, further comprising quantizing the discrete  
28 cosine transformed block of coefficients in the drift reduction frame.

1 10. A method of reducing drift in a block of quantized MPEG discrete cosine  
2 transform coefficients, comprising:

3 computing a drift reference block of discrete cosine transform coefficients;  
4 mapping the drift reference block to a block of quantized video coefficients,  
5 the block of quantized discrete cosine transformed video coefficients having at least  
6 one dropped coefficient using a motion vector; and

7 adding the coefficients of the drift reference block to the coefficients of the  
8 block of quantized video coefficients that have not been blocked to form a drift  
9 compensated block.

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11 11. The method according to claim 10, further comprising variable length coding  
12 the drift compensated block.

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14 12. The method according to claim 10, further comprising repeating the  
15 computing, mapping and adding for each motion vector in a frame of MPEG video.

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17 13. The method according to claim 10, wherein the computing is carried out by:  
18 forming a dropped coefficient block containing at least one coefficient  
19 dropped in quantizing the block of quantized MPEG discrete cosine transform  
20 coefficients;

21 inverse quantizing the at least one coefficient to produce an inverse  
22 quantized dropped coefficient block; and

23 inverse discrete cosine transforming the inverse quantized dropped  
24 coefficient block to produce the drift reduction block.

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26 14. The method according to claim 13, further comprising discrete cosine  
27 transforming the block of coefficients in the drift reduction block.

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29 15. The method according to claim 14, further comprising quantizing the discrete  
30 cosine transformed block of coefficients in the drift reduction frame.

1        16.    An MPEG transcoder, comprising:  
2                a variable length decoder (VLD) receiving an MPEG bitstream and produces  
3        variable length decoded video frames and motion vectors that characterize  
4        movement of objects in the video frames;  
5                a processor that processes the frames of VLD decoded video by dropping  
6        high frequency discrete cosine transform coefficients in blocks of data;  
7                a drift reference frame creator that creates a drift reference frame by, for each  
8        block in the video frame:  
9                processing a block of discrete cosine transform coefficients by  
10               deleting at least one coefficient in the block;  
11               forming a dropped coefficient block containing the at least one  
12               coefficient;  
13               inverse quantizing the at least one coefficient to produce an inverse  
14               quantized dropped coefficient block; and  
15               inverse discrete cosine transforming the inverse quantized dropped  
16               coefficient block to produce the drift reduction block;  
17               a drift compensator that compensates for drift in video blocks in the frame by,  
18        for each motion vector pointing to the frame:  
19               using the motion vector, mapping a block in the drift reference frame  
20               to a block of quantized discrete cosine transformed video coefficients having  
21               at least one dropped coefficient;  
22               discrete cosine transforming the block of coefficients in the drift  
23               reduction block; and  
24               adding the coefficients of the drift reference block to the coefficients  
25               of the block of quantized video coefficients that have not been dropped to  
26               form a drift compensated block; and  
27               variable length coding the drift compensated block.  
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1 17. A method of drift compensating a current frame of MPEG video, the current  
2 frame having a motion vector associated therewith, comprising:  
3 dropping pixels from a reference frame of video;  
4 decoding the dropped pixels to form a drift reference frame;  
5 mapping a block of video from the current frame to a block in the drift  
6 reference frame; and  
7 compensating the block of video from the current frame using the block in the  
8 drift reference frame.  
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10 18. The method according to claim 17, wherein the current frame of MPEG video  
11 has a plurality of motion vectors, and wherein the mapping and compensating are  
12 carried out for each of the motion vectors.  
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14 19. The method according to claim 17, wherein the decoding comprises:  
15 forming a dropped coefficient block containing the at least one coefficient;  
16 inverse quantizing the at least one coefficient to produce an inverse quantized  
17 dropped coefficient block; and  
18 inverse discrete cosine transforming the inverse quantized dropped  
19 coefficient block to produce the drift reduction block.  
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21 20. The method according to claim 17, wherein the dropping comprises dropping  
22 at least one coefficient in the block containing high frequency coefficients.  
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24 21. The method according to claim 17, wherein the dropping comprises dropping  
25 a plurality of high frequency coefficients.  
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27 22. The method according to claim 17, wherein the compensating comprises  
28 adding the block of video from the current frame to the block in the drift reference  
29 frame.  
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1 23. An MPEG transcoder having drift compensation that compensates a current  
2 frame of MPEG video, the current frame having a motion vector associated  
3 therewith, comprising:

4 means for dropping pixels from a reference frame of video;  
5 a decoder for decoding the dropped pixels to form a drift reference frame;  
6 mapping means for mapping a block of video from the current frame to a  
7 block in the drift reference frame; and  
8 a drift compensator that compensates the block of video from the current  
9 frame using the block in the drift reference frame.

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11 24. The apparatus according to claim 23, wherein the current frame of MPEG  
12 video has a plurality of motion vectors, and wherein the mapping means and drift  
13 compensator map and compensate for each of the motion vectors.

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15 25. The apparatus according to claim 23, wherein the decoder decodes the  
16 dropped pixels by:

17 forming a dropped coefficient block containing the at least one coefficient;  
18 inverse quantizing the at least one coefficient to produce an inverse quantized  
19 dropped coefficient block; and

20 inverse discrete cosine transforming the inverse quantized dropped  
21 coefficient block to produce the drift reduction block.

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23 26. The apparatus according to claim 23, wherein the dropping comprises  
24 dropping at least one coefficient in the block containing high frequency coefficients.

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26 27. The apparatus according to claim 23, wherein the means for dropping drops  
27 a plurality of high frequency coefficients.  
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- 1 28. The method according to claim 23, wherein the compensator compensates
- 2 by adding the block of video from the current frame to the block in the drift reference
- 3 frame.

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1 29. An MPEG transcoder having drift compensation, comprising:  
2 means for forming a dropped coefficient block containing the at least one  
3 coefficient;  
4 an inverse quantizer that inverse quantizes the at least one coefficient to  
5 produce an inverse quantized dropped coefficient block; and  
6 an inverse discrete cosine transformer for inverse discrete cosine  
7 transforming the inverse quantized dropped coefficient block to produce the drift  
8 reduction block.  
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10 30. The apparatus according to claim 29, wherein the forming means comprises  
11 means for dropping at least one coefficient in the block containing high frequency  
12 coefficients.  
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14 31. The apparatus according to claim 29, wherein the forming means drops a  
15 plurality of high frequency coefficients.  
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1 32. An electronic storage medium storing instructions which, when executed on  
2 a programmed processor, carry out a method of reducing drift in a block of  
3 quantized MPEG discrete cosine transform coefficients, comprising:

4 computing a drift reference block of discrete cosine transform coefficients;  
5 mapping the drift reference block to a block of quantized video coefficients,  
6 the block of quantized discrete cosine transformed video coefficients having at least  
7 one dropped coefficient using a motion vector; and

8 adding the coefficients of the drift reference block to the coefficients of the  
9 block of quantized video coefficients that have not been blocked to form a drift  
10 compensated block.

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